

# But It's Just a Bottle of Water...

by

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## Part I—Moving In

On the first Mega-Store trip on move-in day at Midwest University, Sally and her mom picked up groceries for the dorm. Sally's mom insisted on getting bottled water for her daughter because of her firm belief that bottled water was safer and cleaner than tap water. Back at the dorm, however, Sally's new roommate, Jane, a sophomore Environmental Studies major, argued against this with facts she had learned in class.

"Did you know that while tap water is frequently tested to maintain public health and safety, bottled water has no guidelines for testing? The FDA can't regulate water that is bottled and sold within the same state, which accounts for 60–70% of bottled water."

Sally was taken aback by her new roommate's comments on the first day that they met. "Ummmm, ok, but it can't be that bad," she mumbled. Sally's mother, on the other hand, admired Jane's enthusiasm and passion for the environment, and her knowledge of bottled water.

"So what you're saying is you want to pay a lot more for untested water sealed in bottles that are horrible for the environment, especially since people don't recycle?" said Jane.

"Water bottles are convenient... anyway, I recycle... sometimes," stuttered Sally.

Jane was appalled to hear that her new roommate didn't recycle often. What kind of person was she? "Do you know what happens to the unrecycled water bottles?!" she asked.

Feeling momentarily brilliant, Sally spouted, "They go into landfills, of course."

"Yes, landfills that are filling quickly," snapped Jane. "We don't have room for water bottles that could be recycled. When water bottles are thrown in the trash, not only do they fill landfills, but they also increase air pollution and help destroy our ozone layer. When they are incinerated with the regular trash, toxic fumes are emitted that are harmful to our health, and these include greenhouse gasses that are also harmful to the environment."

"Okay, okay, you made your point; I'll recycle my water bottles ALL the time," muttered Sally.

"But you still won't stop drinking bottled water! Do you know where the water comes from? A lot of companies get their water from aquifers, many of which are running low. Water bottle companies do bulk water exports, extracting groundwater at unsustainable rates. And did you know that once an aquifer is emptied or polluted, they are almost impossible to restore? Soon we will have some major water shortages."

Sally was frustrated, already arguing with her roommate, but she realized that Jane made a good point, and was impressed with her knowledge. But she still wondered why we didn't hear about these effects if they were so horrible, and what could they do about it anyway.

After meeting Jane, Sally's mom wondered how the girls would get along this semester. She was also intrigued with the information she heard from Jane.

Two weeks later Sally's mother was in the Mega-Store back in her hometown and reached for a case of bottled water. She hesitated and thought... "Should I really be buying this water if it's so bad for the environment?"

### ***Questions***

1. Should Sally's mother buy the bottled water? Why or why not?



## Part II—Background

The recent popularity of bottled water has brought about a multitude of interrelated environmental issues, of which most consumers are not aware. Bottled water costs \$4–\$6 per gallon when purchased over the counter, and is 500–1000 times more expensive than municipal tap water, with no guarantee that the bottled water is safer than tap water. Not only does it cost a small fortune to purchase bottled water, there are numerous associated costs in recycling PET(E). PET(E), or polyethylene terephthalate, is a plastic resin and a form of polyester. PET plastic is labeled with the #1 code on or near the bottom of bottles and is commonly used to package soft drinks, water, juice, peanut butter, salad dressings, and oil, as well as cosmetics and household cleaners. Primary issues related to the production and consumption of bottled water include safety, recycling, and groundwater.

### **Safety**

Safety of drinking water is regulated by different agencies. Bottled water that is sold in states other than the state in which it was bottled (interstate commerce) is regulated by the Food and Drug Administration (FDA) under the Federal Food, Drug, and Cosmetic Act and is considered a food product. Municipal tap water is regulated by the Environmental Protection Agency under the Safe Drinking Water Act of 1974. This Act established health-based standards for drinking water to protect against both naturally-occurring and man-made contaminants that may be found in drinking water.

It is estimated that between 25–60% of bottled water is actually just municipal tap water. Bottled water from municipal sources is usually safe from bacterial contamination since it is chlorinated. Bottled water from non-municipal sources often lacks any treatment, in exchange for the ability to have an “all natural” product. Many producers of bottled water also add additional minerals or flavorings in the water to create a unique taste.

Bottled water that does not come from municipally treated sources may contain coliform bacteria such as *Escherichia coli*, *Campylobacter*, *Proteus*, *Salmonella*, *Serratia*, and *Shigella*. Each of these bacterial contaminants represents potential human health risks. Other concerns have also arisen over protozoan parasites such as *Cryptosporidium*. These organismal contaminants potentially threaten immunocompromised individuals (the very young, the elderly and those with HIV/AIDS). Moreover, bottled water may contain heavy metals (e.g., lead and mercury) and/or organic pesticides (e.g., azatrine), often at levels in excess of state and federal standards.

### **Recycling**

While recycling is required in many states and strongly encouraged by others, the evidence suggests that adequate recycling is not occurring—in California alone, 19 million bottles each day are not being recycled. Recycling of PET plastic across the country has decreased over the past 5 years, and only about 19% of the bottles actually get recycled. The remaining PET bottles and containers end up in landfills.

Eleven states have “bottle bills” requiring deposits (usually \$0.05/container; Michigan is the highest with \$0.10/container) for each bottle purchased, but many states with a bottle bill exclude noncarbonated beverages such as water. While it is clear that these bottle bills are efficient at reducing roadside litter and increasing recycling rates, bottled water (and other noncarbonated beverages) falls into an administrative loophole.

## Groundwater

Most of all, people generally have no idea where their water comes from. Municipalities generally get their water from surface water sources; companies that do not get their water from municipalities get their water from below-ground sources. While all bottled water is not alike, the rate at which water is currently being extracted makes water a potentially non-renewable resource.

There are many different types of bottled water. These differences are based on the source of the water and types of treatments the water may receive.

The types of bottled water listed below often come from municipal sources.

- *Purified water*, which is often distilled, deionized, or filtered (reverse osmosis), removing many of the contaminants that may exist.
- *Sparkling water*, which is water that has been treated and then has had CO<sub>2</sub> added to it.

Bottled water not coming from above ground municipal sources includes:

- *Spring water*, which comes from the surface release of an underground aquifer.
- *Well water*, which comes from an aquifer into which a well has been drilled and water is mechanically pumped to the surface.
- *Artesian water*, which comes from a confined aquifer between impervious layers of rock from which the water flows naturally to the surface.
- *Mineral water*, which contains naturally occurring dissolved solids (>250 parts per million, or ppm).

Many corporations, such as Perrier, have invested greatly in getting the highest quality water, usually looking for “artesian” wells from which to draw. Many scientists believe that there are indirect costs associated with the production and consumption of bottled water. The biggest issue is overuse of the aquifer, leading to reduced stream flow and habitat reduction in aquatic ecosystems. Perrier, for example, wanted to pump 500 gallons/minute over a 5-year period (about one cubic mile of water) from one Wisconsin aquifer—estimated to reduce local stream flow about 50%. This water, once removed and transported around the country, is lost to the local water cycle.

Aquifer recharge rates vary greatly, depending upon annual rainfall and the type of rock water must percolate through. But since this is an open system—water is being transported out of the aquifer—water becomes a locally non-renewable resource if the withdrawal rate exceeds the rate of recharge.

## Questions

1. How can we make society more aware of the environmental problems associated with bottled water?
2. What will be the future impact on the environment if we continue to use bottled water like we do today?
3. Is bottled water better or healthier for you than tap water? Are there times when bottled water is essential? Are there times when it is not?
4. List three ways you can help solve the environmental problems caused by water bottles.

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## EXTENSION EXERCISES

1. Write a one-paragraph press release that details the problems of recycling water bottles.
2. Bottled water entangles a variety of environmental issues. In this case we have presented three—groundwater, recycling, and water safety. List one other issue that could be addressed and relate it to the material presented in the case.